

Digital preservation of Indigenous Knowledge (IK) by Cultural Heritage Institutions: A comparative study of Nigeria, South Africa and Uganda

Nomusa Biyela, Metadata Consultant, Human Sciences Research Council, Box 41, Pretoria, South Africa, 0001, NBiyela@hsrc.ac.za

Adetoun Oyelude, Principal Librarian, University of Ibadan, Ibadan, Nigeria
toyelude@yahoo.com; aa.oyelude@mail.ui.edu.ng

Eric Haumba, Chief Librarian, YMCA Comprehensive Institute, Kampala, Uganda. haumban@gmail.com; enhaumba@yci.ac.ug

Abstract

This paper strives to explore the state of digitisation of Indigenous Knowledge (IK) across the three countries: Nigeria, South Africa and Uganda. IK in Africa has gained momentum as a strategic resource for socio-economic development hence the need for its effective management. Many studies concur that the bulk of the world's heritage resources including digitally born resources have been lost and some cannot be recovered due to neglect. Digitisation is viewed as a tool that can be used to provide long-term preservation and global access to IK. To gain insight about the state of IK digitisation projects of the studied countries nine (9) cases were studied. Data presented and discussed in this paper was obtained using semi-structured interviews. For one case of the nine, content analysis for the web-based portal of a national heritage repository was conducted. Secondary data was further obtained through document search of relevant print and electronic resources. Recommendations suggest the need for intensifying digitisation projects of IK found in rural communities; collaborative approach; increased funding and capacitating of information professionals in the digitisation of heritage resources.

Keywords: indigenous knowledge; heritage resources; digitisation; cultural heritage institutions

1. Introduction

Africa's wealthiness in terms of IK particularly agricultural IK has been reiterated in many studies. Approximately 90% of the food produced in sub-Saharan comes from traditional farming (Dakora in Normann, Synman & Cohen 1996, 109). Notwithstanding that, some African countries are still haunted by poverty, hunger and diseases. It is estimated that 45% of the people still live in extreme poverty while 35% live in moderate poverty (Mchombu 2007, 31).

Some African intellectuals are of the view that Africa is haunted by intergenerational curse due to a number of socio-economic challenges experienced such as power struggles; women abuse; inequality; human

trafficking; poverty; hunger; illiteracy; social exclusion; unemployment; HIV/AIDs and other diseases; ghettoization; ethnic conflict; racism; sexism and xenophobia (Nhamo & Chekwoti 2014). This is a cause for concern because Africa has been nourished and nurtured through folklores in order to embrace and sustain the spirit of Ubuntu or humanness. It is apparent that the marginalization of IK has impacted negatively towards the development of Africa. Given that many African intellectuals, communities and organisations globally have endorsed the need for the revitalization of IK and its preservation for posterity.

2. An overview of literature review

The literature reviewed revealed that IK is not restricted to a single definition. It can be contextualised depending on the theme, the author wants to stress. For example the National Research Foundation (NRF, 2006) as cited in Green (2007) defines IKS as the complex set of knowledge and technologies existing and developed around specific conditions of population and communities indigenous to a particular geographic area and their interfaces with others. For Deacon, Dondolo, Mrubata and Prosalendis (2004, 1) IK can be divided into tangible and intangible and Ndlovu (2015) asserts that intangible domains are also known as 'living heritage' or 'living culture'. Given the wide ambit of IK, for this paper the focus will be on the digital preservation of tangible and intangible IK embedded in rural communities such as agricultural IK and folklores.

Akinwale (2012, 5) defines IK management as a process by which communities capture, control and share their IK in order to meet specific local needs. IK management implicates the use of both traditional and modern methods. Traditional methods include oral tradition such as word of mouth, storytelling, folklores; communities of practise, etcetera. In this 21st century digitisation is one of the popular modern methods. Digitisation is defined as the process of codifying information or knowledge so that it can be accessed globally and on a long-term basis (Akinwale 2012). An overlap has been noted in the term digitisation and digital preservation. Digital Preservation Coalition (DPC, 2002) as cited in Kalusopa and Zulu (2009, 98) explains digital preservation as the way of preserving information materials such as digital surrogates created as a result of converting analogue materials to digital format and those which are born digital and were not in analogue format before. Digital preservation differs from digital archiving in that the former refers to a series of adopted management activities that are undertaken to ensure continued access to digitised materials for as long as the agreement prevails while the latter refers to the process of creating backup as opposed to strategies for long-term digital preservation.

In some libraries especially academic libraries, the importance of digitisation has been associated with institutional repositories. The collection digitised includes but is not limited: research outputs; theses; newspapers; photographs; history

papers; etcetera. Notwithstanding that many IK scholars and cultural heritage institutions are still lamenting that heritage resources especially digitally born will become inaccessible in the future unless they are digitised (Breytenbach, Lourens & Marsh 2013, 1; Dewah & Feni-Fete 2014, 77). Consequently, in October 2003, the thirty-second session of the general conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted a Charter on the Preservation of the Digital Heritage. The aim of the Charter was to intensify projects for the safeguarding of documentary heritage resources (Lusenet 2007,164; South African Department of Arts & Culture, 2010). In 2015 the International Federation of Libraries Association (IFLA) stressed its support for the UNESCO Vancouver Declaration of the libraries' role of providing access and safeguarding of heritage resources (UNESCO Memory of the World Programme 2015).

In January 2010 the African Union Heads of State and Government adopted a declaration that calls on the African countries to prioritize ICTs as a vehicle for driving Africa's development agenda. The increased use of ICT infrastructure was viewed as the prerequisite for the African countries to develop the ICT sector and to also achieve sustainable development (South African Department of Arts & Culture 2010,19). While the initiatives are recognised their fruits in line with digital preservation of IK have been at a snail's pace in Africa as most African countries are still battling with IK digitisation projects. For example, Ngulube (1999, 31) indicated that archival fraternity was not fully conversant with the opportunities and challenges of preserving digital records. Five years later Lor (2004) underscored that the volume of digital materials including heritage resources published in the sub-Saharan Africa was slowly growing. Further he alluded that African institutions did not have the capacity to collect and preserve Africa's heritage (Lor 2004,70). Eight years later Akinwale (2012:1) reports that albeit IK of Africans remains a gold mine, but the challenge was that Africans are currently behind the rest of the world in terms of IK digitization for global access.

Problem statement

As supported by considerable theoretical and empirical evidence marginalization of IK has had some adverse effects on Africa's development. In this 21st century the traditional roles of cultural heritage institutions have been challenged in terms of relevancy of their content in line with the needs of the diverse users they are serving (Chisita 2011; Mutula 2008; Ocholla 2009). Digitisation has become a burning topic because it is viewed as a tool that can be used to preserve IK for posterity and also to increase visibility and global access to IK. It is hoped that global knowledge sharing can help Africa bridge knowledge and digital divide and thus curb the scores of poverty and other socio-economic challenges. While some scholars are of the view that the volume of digital materials including heritage resources published in the sub-Saharan Africa was slowly growing Lor

(2004, 70); Ocholla & Onyacha (2005) others such as Akinwale (2012, 1); Ngulube (1999, 31) are of the view that Africans are currently behind the rest of the world in terms of IK digitization for global access. Some argue that in their endeavour to digitise IK, cultural heritage institutions are thwarted by many challenges such as: lack of or insufficient funding; digital rights management; complexity of ownership protocols; loss or misappropriation of digitised IK; lack or limited skills; inadequate infrastructure; lack of resources and unreliability of the preservation media (Akinwale, 2012; Dewah & Feni-Fete, 2014; Sithole, 2007). In most cases the success of digitisation projects in Africa is determined by the support of the international funding.

3. Purpose and objectives

The purpose of this paper was to gain insight regarding the state of IK digitization across the three countries: Nigeria, South Africa and Uganda. According to Lor (2005:67) repository libraries wishing to play role in the preservation of digital heritage resources need to consider factors such as technical; organisational; economic; political; legal and ethical. Based on the purpose of this study the objectives were to explore IK management in line with the following factors:

- Technical (typology of IK and tools used to digitise; access protocols; copyright compliance)
- Organisational (how is the collection organized; inter-institutional matters and staff training issues)
- Economic (how is funding acquired or sourced)
- Political (inter-country collaborations)
- Legal and ethical considerations (intellectual property laws)

4. Research Methodology

Comparative method was used. The focus of comparative method is on the analysis of similarities and differences between the cases studied. Comparative research can eliminate or offer explanations regarding causal relationships. It can be divided into various types: case-study comparative; cultural context; cross-national and transnational (Neuman 2003). This study adopted case-study approach in order to compare cases regarding digitization of IK by the sampled cultural heritage institutions across the three countries.

4.1 Sampling procedure

While it is acknowledged that the concept of digitisation has become popular in memory institutions such as libraries, archives and museums but in this study results indicated that digitisation projects were prevalent in university libraries and national libraries. Purposive sample was used. The institutions were targeted

because they were involved in the digitisation projects of various heritage resources such as: books; newspapers; history papers; audit reports; photographs; etcetera.

For example, in Nigeria four heritage institutions were targeted. In South Africa three were targeted: the Auditor General of South Africa (AGSA); the National Research Foundation (NRF) and the National Library of South Africa (NLSA). In Uganda two were targeted: Makerere University and National Library of Uganda.

4.2 Data collection procedure

Data collection procedures included survey monkey questionnaire; telephone and e-mail interviews; content analysis of a web-portal and document search. In addition, findings of empirical research studies which were conducted by some of the authors on IK management in rural communities also informed this paper.

In order to comprehend the state of IK in the sampled countries, research questions were structured in line with the objectives of this study as indicated below:

1) Technical factors

- a) Please indicate whether your institution has a dedicated digitization unit.
- b) When or what year did the digitization project start?
- c) What type of documents are digitised; how are they selected and why? (Please explain if there is any IK collection policy and how big is the collection)
- d) Please indicate if the institutional digitization policy complies with the country's digitization policy. Please indicate challenges and opportunities.
- e) What are the challenges experienced regarding IK document collection and digitization?
- f) What are the opportunities experienced by digitizing IK?
- g) Please indicate what electronic technologies are used for the digitization project?
- h) What are their advantages and disadvantages?
- i) What digitization standards are used and what are their advantages and disadvantages

2) Organisational factors

- a) Please indicate how many staff members are designated for the digital preservation unit?
- b) Please indicate their highest qualification
- c) Have they attended any training programmes for digital preservation of IK?

d) Are there any IK materials that are digitised off-site and stored on external servers?

e) Please indicate if the designated staff are responsible for the development of the digitization policy and what does it entails or what aspects does it covers?

f) Does the institutional digitization policy comply with the country's digitization policy? Please indicate challenges and opportunities

3) Legal factors

a) Please explain how is ownership protocol observed or copyright protected? (Please explain if there is any copyright policy).

b) Who is given access and why? (Please explain access protocols whether there is any access policy).

c) Please explain access statistics per month and the category of users such as researchers, lecturers, students and community members and challenges of access protocols?

d) What are the opportunities experienced by digitizing IK or IKS?

4) Economic factors

a) Please indicate if the project has any sponsors.

b) Please explain any other future plans regarding the digitization of IK projects.

b) Please give any other comments regarding your digitization project.

4.3 Presentation of the findings

The findings are presented in tabular format. In all, nine (9) institutions participated, 4 from Nigeria, 3 from South Africa and 2 from Uganda. The nine institutions that participated were named cases A; B; C; D; E; F; G; H and I.

Nigeria

Questions	Case A	Case B	Case C	Case D
Digitization unit/ Start, Objectives?	2008, to provide electronic version of some rare materials for upload.	2010, to preserve and promote wider visibility and access.	2007 to digitise local content of the institution.	Yes, started, but no dedicated preservation unit

Type of collection	Theses, Dissertations, Africana materials, other local content.	Journals, articles, lectures and books	Historical records	Archive
Compatibility & Institutional policy; Why?	Selected by importance; because they are indigenous.	Selected based on value; for preservation and access.	Selected through consultations with the elderly; To preserve and transmit them to succeeding generations.	No policy
Challenges & opportunities	No response	No response	No response	No response
Electronic technologies	No response	Scanners, Computers, UPS, External Drive for storage, Adobe Acrobat, Micromedia Fireworks & Antivirus.	No response	No response
Digitization standards	No response	International Standard	No response	No response
Staff complement		Three	No response	One
Staff qualifications	No response	Masters degree, Bachelors Degree.	No response	Masters Degree
Digitization policy	No response	No response	No response	No response
Copyright policy	There is copyright policy; Copyright of Thesis and Dissertations	Authors are being contacted before full text of their	There is copyright policy and copyright protection guaranteed.	No policy

	belong to the University	works are accessed.		
Access policy: Who has access?; Why?; Type of access protocols	Library users have access; For global visibility; Full text	Anyone who wants to use; Because it is not for commercial purpose; (No response)	Students, staff, alumni, ex-service men/women, authorized researchers from other institutions; For administrative, research and scholarly communication.	All have access
Future plans & comments	No response	It is an on-going project. It should be well funded.	No response	More funding is needed

South Africa

Questions	Case E	Case F	Case G
Digitization unit/ Start, Objectives?	2009, to house collections of universities, research institutes, non-governmental organizations (NGOs) & interested community members	Start year not indicated. Digitises on demand and occasionally small specific projects.	No unit. Project started 2008, to build a database for hard copy annual reports.
Type of collection	History papers, ethnographic photo collections, museum collections, theses and dissertations, archival films, maps, books,	Maps, books, pamphlets, rare books, letters, albums, photos and negatives done only on demand.	Large collection of reports dating back to 1910.

	letters, albums & all kinds of special collections.		
Compatibility & institutional policy	The South African National Policy on Digitization informs the National Heritage Repository digitization policy	The institution complies on certain criteria.	No response
Challenges & opportunities	Some important institutions have not forwarded their unique collection; Duplication of work as some institutions have their digitization units	Storage space; access for users; indexing; metadata. Materials become available.	No response
Electronic technologies	PC, 3D large high production scanner, D-space open source software, Special software for optical character recognition.	Computers and large format scanners	Scanner & full version of Adobe Acrobat Pro XI (software).
Digitization standards	Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH), Dublin Core for resource description, VRA Core, Darwin Core, and XML encoding language.	Metamorfoze (or Fadgi) which cannot be fully implemented due to lack of funding.	No response
Staff complement	One (1)	Three (3)	One (1)
Staff qualifications	(Not indicated)	Masters degree	No training on digitization.

Digitization policy	The DAC developed the digitization policy.	Staff does not develop digitization policy.	Staff does not develop digitization policy.
Copyright policy	Creative commons licences are used.	Digitization requestor has to provide written approval from copyright holder giving permission to digitise.	No response
Access policy	Password-controlled access is given to all the users.	Access to digitised items is given to library staff only.	Everyone in the organization has access.
Future plans & comments	Sustainability of funding; Best practice guidelines for the practitioners; copyright compliance critical; digitization crucial for preservation & increased access	To expand the variety of materials to scan, index and include proper metadata. Challenges include: lack of funding; equipment of high quality; lack of IT support.	Outsourcing of services; More professionals needed to give guidance on digitization and preservation.

Uganda

Questions	Case H	Case I
Designated digitization unit/ Start?	Yes, and the project started in 2008. The aim was to build a database for hard copy annual reports and local artefacts.	Yes the project started in 2014. The aim of the project was to collect Indigenous Agricultural Knowledge to profit academics and farmers.
Type of collection	Large collection of reports dating back to 1910. They include Books on the early missionary works in Uganda, agreements signed by the British with the various tribal rulers for example, Muteesa I, the	Indigenous Agricultural Knowledge in various values chains such as crop management, soil management, pest and disease control and management.

	King of Buganda and local newspapers	
Compatibility & Institutional policy Why?	The Institution complies with the national policies on access to information. There is free access to such materials to all citizens.	The project complies with both institutional and national policies.
Challenges & opportunities	Some parties are not willing to reveal the information easily, technology levels are still very low when the donors withdraw funding, and the projects fail to continue. The advantage was to get easy access to information at any given time	Funding is limited and the knowledge is scarcely located in a small section of elders and farmers who are not very willing to share it.
Electronic technologies	Scanner & full version of Adobe Acrobat Pro XI (software)	Smart phones, Computers, Scanners and Digital Cameras.
Digitization standards	Digital images such as photographs and are saved in both JPEG (Joint Photographic Experts Group Format) and TIFF (Tagged Image File Format).	No response
Staff complement	No designated unit but two employees are responsible for the project.	Project staff include students who are attached to the project and their academic supervisors.
Staff qualifications	Bachelor's Degree	PhD, Master's degree and Bachelor's Degree
Digitization policy	There were no materials stored offsite or on external servers.	There is a unit and separate section for this project. Funding comes from external sources
Copyright policy	No copyright restriction for the materials.	Creative commons licence. The content is Open educational Resources.
Access policy: Who has access? Why? Type of access protocols	Access is free to the entire public.	The information is available online and anybody can access the information from any part of the world.

Future plans & comments	Will be launched and content to be put online. Additional funding is being sought.	Phase three of the project will be rolled out as soon as the MoU is signed,
-------------------------	--	---

4.4 Discussion of the findings

In Nigeria, digitization of indigenous knowledge is so slow as to be almost non-existent. The universities that are digitizing do not have adequate funds for the projects and their staff are not trained specifically for digitizing IK. They just have the normal qualifications of Masters Degree in Librarianship. In some cases, the staff in charge are just Bachelors degree holders, not even in Librarianship. The technologies used are mainly scanners, computers, and external storage drives. The copyright issues are well taken cognisance of and access is provided to all who request for materials with the proper permissions adhered to. Though three of the respondents (A, Band C) were University libraries, and the cultural heritage library does not have all facilities in place, it is obvious that digitization efforts need to be seriously co-ordinated at National level in Nigeria.

In South Africa results indicated that the Digital Imaging of South Africa (DISA) project started in 1999. DISA-1 is hosted by the University of KwaZulu-Natal, Alan Paton library. It was funded by the Andrew W. Mellon Foundation. DISA-2 began in 2003. It is known as the ‘South African Freedom Struggles’. It comprises of heritage resources ranging from 1950-1954. Its aim is to build on-line high-quality information resource containing materials of heritage importance and interest to scholars and students and to make it visible and accessible globally. In 2009 NRF (Case E) was commissioned by government (DAC) to host national heritage resources of all institutions whether governmental or non-governmental under one web-based portal known as ‘National Heritage Repository’. It can be accessed in this web address: <http://digi.nrf.ac.za/>. The project is funded by the Carnegie Corporation of New York. Although with some institutions this means duplication of the work, but it has helped to bring heritage resources under one roof. In 2010 the Department of Arts & Culture (DAC) promulgated the National Policy on Digitization of Heritage Resources. The National Heritage Repository has helped in incorporating heritage resources of various kinds such as photographs; history papers; and others in one portal. The results of the content analysis indicated that the equipment used for digitising includes large high production scanners; computers and a special kind of software. Content is protected through a license called creative commons licence. This type of license helps creators or licensors to retain copyright while also allowing others (licensees) to copy, distribute and make some uses of their work at least for non-commercial purposes. Access to the portal is password-protected. To facilitate retrieval of information digitisation

standards such as OAI-PMH and Dublin Core for resource description are used. The knowledge manager responsible for managing the portal and the content is professionally trained for the job.

Case F did not indicate when the project commenced. Their focus is on specific projects. Small digitisation projects take place according to the demand at the time. Maps, books, pamphlets, rare books, letters, albums, photos and negatives are all digitised depending on the demand at the time. Computers and large format scanners are used. Digitisation standards known as Metamorfoze (or Fadgi) are not fully implemented due to lack of funding. Regarding copyright compliance a requestor has to provide written approval from copyright holder giving permission to digitise. Only authorised users are allowed to access digitised items. Future plans include expanding the variety of materials to scan, articulation of indexing and metadata expertise. Challenges include lack of funding; scarcity of equipment of high quality and lack of IT support. Three staff members responsible for the digitisation projects have Masters degree and are skilled in digitising heritage resources.

For Case G, digitisation project started in 2008. The aim is to build a database for hard copy annual audit reports dating back to 1910. The equipment used includes scanner & full version of Adobe Acrobat Pro XI (software). Everyone in the organization has access to the database. Future plans include the outsourcing of services; the sourcing of more professional staff in order to give guidance on digitization and preservation. The staff member responsible is not professionally skilled in digitising heritage resources. It is argued that all is not lost in South Africa, although progress is slow, but something is happening. However, IK for rural communities are not sufficiently incorporated into the digitisation projects.

For Uganda, from the responses, two institutions namely Makerere University and National Library of Uganda have got dedicated digitization units: the AgShare Indigenous Knowledge digitization project and World Digital Libraries (WDL) digitization units respectively. However, it was observed that many more institutions possess cultural heritage materials although they lack digitization units. They include: Kyambogo University, Uganda Museum, Uganda Society, Bank of Uganda, Parliament of Uganda, Buganda kingdom, Uganda National Archives, and Uganda Christian University.

The digitization project at the National Library of Uganda commenced in 2009, with the general objective to trace and digitise Uganda's political, economic and social culture According to face to face interview with the Director, NLU, WDL (Uganda), specific objectives include: Promoting Uganda's heritage worldwide, bringing Uganda national heritage in one place/space for use by both intellectuals and the general Ugandan public, conserving and preserving Uganda's heritage

presently, documentation of Uganda's history and cultures is in a very bad state as well as contributing to regional cooperation.

For the Agshare project at Makerere University under the college of Computing and Information sciences, the project started in 2014. According to the one coordinator of the AgShare project at Makerere University and the Principal investigator, the project had the following objectives: identification of farmer needs and the alignment of Agshare II project products with their needs; identification of existing indigenous knowledge (IK) initiatives running within these communities and opportunities to collaborate or extend them to a wider part of the country, collecting data to upload into a functional database and to distribute the collected and stored indigenous agricultural knowledge into the communities, as well as devise a strategy to feed the findings back into the institutional teaching and learning processes.

At National Library of Uganda, the types of IK materials include books on the early missionary works in Uganda, agreements signed by the British with the various tribal rulers for example, Muteesa I, the King of Buganda and local newspapers. At Makerere University, IK materials include pest and disease management, soil management /fertility & fertilizers, water conservation & irrigation, food preservation & storage, indicators of weather change, food processing. Whereas they are selected according to cultural heritage attachment at NLU, at Makerere they are selected based on agricultural value chains such as poultry, livestock and crops. This according to respondents from both institutions is because much of the IK knowledge is disappearing and there is need to document such knowledge for the future generation.

There are no copyright issues and no restricted access to the materials at both institutions. The Agshare materials are available online while the National Library materials are not available online, but they can be readily made available upon request.

5. Recommendations

The recommendations are made in line with the findings and objectives of this paper:

1) Technical considerations

It was notable that although South Africa has been slow in embracing the opportunities offered by the digitisation of its heritage resources but there are numerous discrete digitisation projects completed or underway at present. Comparatively South Africa emerged as the only country that has instituted the web-based portal of the national heritage resources known as 'National Heritage Repository'. It is hosted by NRF and can be accessed on <http://digi.nrf.ac.za/> (Page-Shipp, 2009). In addition, in 2010 the DAC promulgated the country's

national policy on digitisation of heritage resources. It serves as a guiding framework for institutional policies. The two institutions sampled in Uganda had designated digitisation units. They digitise various resources such as books; theses; annual reports etc. It was not clear if the sampled institutions in Nigeria have dedicated digitisation units. The various resources that are digitised include rare collection, theses, dissertations, Africana materials and other local content. A collaborative approach is recommended for digitisation projects and also the development of national policies. The national policy can serve as a guiding framework for the institutional digitisation projects.

Regarding the equipment used for digitisation, in all three countries it emerged as a common pattern that personal computers (PCs), 3D large high production scanners are used. In addition South Africa uses D-space open source software and special software for optical character recognition. In Uganda results indicated that smart phones and digital cameras were also used. Further it transpired that some participants were not willing to reveal information because the level of technology is still low. The participants' lack of interest to reveal information can be informed by many reasons such as lack or limited knowledge; lack of trust and issues related to organisational culture. While knowledge about digitisation standards used by Cases E and F in South Africa are clearly articulated it was not very clear which standards are used by the other cases that were sampled. The results for this study underscore the need for the intensification of short-term IT projects for information professionals which are currently conducted by the University of Pretoria (UP). The IT-related and data management projects such as curation courses offered by the University of Cape Town (UCT) and other African universities are critical in this 21st century. Therefore this paper recommends that IT-related courses including digitisation courses should be increased in the library and information science (LIS) academic sectors. In addition cultural heritage institutions also need to increase digitisation projects which are based on collaborative and inter-Africa approach.

2) Organisational considerations

In the cases where the designated units existed responses indicated there was one or not more than three responsible staff member/s. Responses regarding staff qualifications indicate that the majority of staff responsible for the digitisation units have post-basic degree qualifications such as Masters and doctorate degrees. It was not very clear whether they are skilled in digitising and managing digital resources. Case G in South Africa indicated that he was not trained or skilled in digitising IK. As many studies have recommended this paper reiterates the need for staff training in digital preservation so that they can be able to cascade the skill to the colleagues and community members as need arises.

3) Legal considerations

Case E indicated that the content was protected by a license type known as Creative Commons. This type of license uses similar principles as copyright laws but in addition a special legislation is used to protect the software. Open access is allowed to a greatest proportion of the content. With the other case studies copyright laws protect the content. Case E also uses password controlled access to the resources. Case F & G access was given to authorised users only. For Cases A, B, C, H & I in Nigeria and Uganda access is open to all the library users. The recommendation is for the institutions to use their discretions depending on the agreement made with the intellectual property owners. Access protocol issues can be debated between the relevant stakeholders.

4) Economic considerations

The majority of responses indicate that the surviving digitisation projects are normally supported by international donors. Most responses recommended the need for more funding in order to increase the number of digitisation projects. This is critical in order to promote preservation of IK with special focus on IK for rural communities. Global knowledge sharing is important for the development of informed and knowledge society in Africa (Chisenga 2002).

6. Limitations of the study

Limitations included the following factors: time was limited, and data was not sufficiently collected; researchers were far apart from each other and some of the issues could not be clarified effectively and efficiently. Some of the identified cultural heritage institutions were reluctant to participate and some did not respond to the e-mail interviews. Some of the research questions were vague and overlapping such as some of the technical and organisational questions.

7. Conclusion

This paper has presented information on the status of digitisation projects across the three countries studied. The overall conclusion is that projects for the digitisation of heritage resources are limited in Africa. This is due to the fact that Africa is not sufficiently capacitated to collect and preserve IK. It cannot be over-emphasised that it is imperative that LIS academic sectors need to increase IT related; digitisation and data management courses. In addition, cultural heritage institutions also need to increase projects for the digitisation of heritage resources. A collaborative approach that is inter-institutional and inter-regional is also important in order to increase visibility and information and knowledge sharing activities.

References

- Akinwale, A.A. (2012) Digitisation of indigenous knowledge for natural resources management in Africa. *Proceedings of the AERN Summit*. Paper presented at the 20th Anniversary Summit of the African Educational Research Network at North Carolina State University, Raleigh, USA, 19 May (pp.1-18).
- Breytenbach, A., Lourens, A & Marsh, S. (2013) The role of the Jotello F. Soga Library in the digital preservation of South African veterinary history. *Journal of the South African Veterinary Association* 84 (1) pp. 1-7.
- Chisenga, J. (2002) Indigenous knowledge: Africa's opportunity to contribute to global information content. *South African Journal of Libraries and Information Science* 68 (1) pp. 16-20
- Chisita, C. T. (2011) Role of libraries in promoting the dissemination and documentation of indigenous agricultural information: case study of Zimbabwe. Paper presented at the 77th IFLA Conference on information systems for indigenous knowledge in agriculture, San Juan, Puerto Rico, 13-18 August.
- Dakora, F.D. (1996) Using indigenous knowledge to increase agricultural productivity in Africa In: Normann, H., Synman, I. & Cohen, M. (eds.) *Indigenous knowledge and its uses in Southern Africa*. Pretoria, South Africa: HSRC Press pp.109-135.
- Deacon, H., Dondolo, L., Mrubata, M. & Prosalendis, S. (2004) *The subtle power of intangible heritage: legal and financial instruments for safeguarding intangible heritage*. Cape Town, South Africa: HSRC Press.
- Department of Arts & Culture (2010) *South African National Policy on Digitization of Heritage Resources*. Final Draft for Public Review. <http://www.dac.org.za> [accessed 10 January 2016]
- Dewah, P. & Feni-Fete, V. (2014) Issues and prospects of digitising liberation movements' archives held at the University of Fort Hare, South Africa. *Journal of the South African Society of Archivists* 47 pp. 77-88.
- Green, L. (2007) The Indigenous Knowledge Systems Policy of 2004: challenges for South African Universities. *Social Dynamics* 33 (1) pp. 130-154.
- Kalusopa, T. & Zulu, S. (2009) Digital heritage material preservation in Botswana: problems and prospects. *Collection Building* 28 (3) pp. 98-107. www.emeraldinsight.com/0160-4953.htm [accessed 28 January 2016].
- Lor, P.J. (2005) Preserving African digital resources: is there a role for repository libraries? *Library Management* 26 (1/2) pp. 63-72.

Lusenet, D. Y. (2007) Tending the garden or harvesting the fields: digital preservation and the UNESCO Charter on the preservation of the digital heritage. *Library Trends* 56 (1) pp. 164-182

Mchombu, K.J. (2007) Harnessing knowledge management for Africa's transition to the 21st century. *Information Development* 23(1) pp. 25-42.

Mutula, S. (2008) Local content development projects in Africa. *South African Journal of Libraries and information Science* 74(2) pp. 105-115. (Accessed on 20 July 2014).

Ndlovu, N. (2015) Living heritage vs. heritage legislation: exploring the preservation of living heritage in the post-apartheid South Africa. Paper presented at the Human Sciences Research Council Seminar, Pretoria, South Africa, 21 September.

Neuman, W.L. (2003) *Social research methods: qualitative and quantitative approaches*. Boston: Allyn & Bacon.

Nhamo, G & Chekwoti, C. (2014) *Land grabs in a green African economy: implications for trade, investment and development policies*. Pretoria, South Africa: Africa Institute.

Normann, H., Snyman, I. & Cohen, M. (1996) *Indigenous knowledge and its uses in Southern Africa*. Pretoria, South Africa: HSRC Press.

Ocholla, D.N. (2009) Are African libraries active participants in today's knowledge and information society? *South African Journal of Libraries and Information Science* 75(1) pp. 20-27.

Ocholla, D.N. & Onyacha, O.B. (2005) The marginalized knowledge: an informetric analysis of indigenous knowledge publications (1990-2004). *South African Journal of Libraries and Information Science* 71(3) pp. 247-258.

Page-Shipp, R. (2009) *An audit report of digitisation initiatives, ongoing and planned, in South Africa: Report to the National Research Foundation*. <http://digi.nrf.ac.za/pub/> [accessed 28 January 2016].

Sithole, J. (2007) The challenges faced by African libraries and information centres in documenting and preserving indigenous knowledge. *IFLA Journal* 33(2) pp. 117-122. <http://www.ifla.sagepub.com/content/33/2/117> [Accessed on 27 February 2016].

United Nations Educational, Scientific and Cultural Organization (UNESCO) Memory of the World (MoW) (2015) Intergovernmental Special Committee meeting of experts (Category II) related to a Draft Recommendation concerning

the Preservation of, and Access to, Documentary Heritage in the Digital Era, UNESCO House, Paris (Fontenoy Building, Room IV), 1-2 July (pp. 1-9).

Biographies

Nomusa Zimu (MInf.) is a Metadata Consultant at the Human Sciences Research Council (HSRC), Library & Information Services Department. She is passionate about information for development and is involved in a number of community projects in this area. She is currently completing a doctoral study at the University of South Africa that looks into indigenous knowledge systems in rural South Africa. Metadata Consultant, HSRC Information Services, 134 Pretorius Street, Pretoria 0001, South Africa. Tel: 027 12 3022158. Fax: 027 86 734 5311. Email: nbiyela@hsrc.ac.za

Adetoun Oyelude (CLN) is a Principal Librarian at the University of Ibadan, Nigeria. She is a Chartered Librarian, passionate about cataloguing. In addition she is currently completing a doctoral study at the University of Ibadan, Nigeria that looks into indigenous knowledge management by cultural heritage institutions in Nigeria. Principal Librarian, University of Ibadan, Nigeria. Tel: 02234- 8033197941. Email: aa.oyelude@mail.ui.edu.ng

Eric Haumba (MInf.) is a Head at the YMCA Comprehensive Institute, Kampala. He has just completed his Masters degree in Information Science that looked into harnessing indigenous knowledge (IK) methods in rural Uganda. The main aim is to increase visibility and knowledge sharing among rural villagers locally, regionally and globally. Head, YMCA Comprehensive Institute, Kampala. Tel: +256-414 233-294. Email: haumban@gmail.com;

